REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested.

The Examiner is thanked for withdrawing the finality of the last substantive Office Action in the communication dated 01/21/2004.

The Examiner's attention is drawn to the applicant's submission of certified priority documents on January 15, 2004. Appropriate written confirmation of receipt is respectfully requested.

In response to the Examiner's objection to claim 76 for use of a term inconsistent with subsequent dependent claims, claim 76 has been amended above so as to obviate this ground of formality objection.

The rejection of claims 66, 70, 71, 75-78, 82, 83 and 87-90 under 35 U.S.C. §103 as allegedly being made "obvious" based on Gitlin et al. '689 in view of Ramfelt et al. '315 is respectfully traversed.

Gitlin '689 is directed to asynchronous packet-based communications – which is the antithesis of applicant's claimed synchronous frame-structured communication system. On that basis <u>alone</u> Gitlin '689 is essentially irrelevant to the claimed invention.

Gitlin '689 also is exclusively directed to a species of "almost all" optical networks wherein electronic switching circuits at nodes only convert low speed portions of an optical packet signal train (e.g., the header and/or trailer) to electrical form to operate electrical control circuits. The electrical control circuits operate at this slower speed while the main payload optical data packet simply bypasses the entirety of the control electronics and passes onto an electro-optical switch via a delay line (required because of the lower speed electronic circuit response times).

Accordingly, the Gitlin et al. '689 apparatus/method actually appears "transparent" to the optical data packet payload being switched – thus permitting the packet payload to conform to any desired arbitrary optical signaling format or parameters.

As the Examiner has already explicitly appreciated, Gitlin '689 fails "to disclose synchronization is maintained by the provision of a regular frame structure, which has the same frame period in both segments of the network". Indeed, such regular frame structure would be inconsistent with the arbitrary transparent packet data structure that is the whole basis of the Gitlin '689 teaching. Insofar as the data packet payload is concerned, it does not appear that Gitlin '689 teaches anything about how the data on one overlaid ring network might relate, if it does at all, to the framing, data rate, etc. on a different overlaid packet data ring network. At best, Gitlin '689 merely recognizes that an advantage of a time division multiplex (TDM) system (if employed) is that it can

readily provide framing information (e.g., see column 4, lines 14-16) – and that the header structure on the Gitlin '689 ring contains a simple two-bit indication to identify which overlaid ring network a particular packet belongs to (e.g., see column 4, lines 35-37).

To supply this admitted and fundamental deficiency of Gitlin '689, the Examiner relies upon Ramfelt '315 as allegedly disclosing "that in [a] ring network, frame structure (cycle time and slot length) must be same (constant) for maintaining synchronization when the networks operate at different speeds (column 9, lines 1-5)". However, this assertion is demonstrably untrue as explicitly taught by Gitlin '689 itself – especially for a transparent packet-based node switch structure as taught by Gitlin '689.

Furthermore, Ramfelt '315 describes only a species of dynamic synchronous transfer mode (DTM) ring topology that appears to be an "all" optical network that is totally dissimilar to the "almost all" optical network of Gitlin '689.

In particular, in the DTM environment of Ramfelt '315, it may well be necessary to have constant frame structure to maintain synchronization – especially when two DTM rings operating at different speeds are to be interlinked. However, this has nothing whatever to do with the Gitlin '689 teaching.

Indeed, the gist of the Gitlin '689 packet-based teaching is that the switched topography is essentially <u>transparent</u> to the optical data packet payload. Accordingly, the

optical data packet payload may have entirely different frame structures in different (even contiguous) packets. For example, the optical data payload in any given packet might actually include its own self-contained and self-defining clock, and frame structure – that has essentially nothing whatever in common with the periodicity, framing, etc. of the lower rate header and/or trailer control data.

In short, it would clearly not be "obvious" for any person skilled in the art to try to modify Gitlin's packet-based system based on some teaching of the quite disparate Ramfelt '315 teaching. To "modify" either of these references in view of the other would require essentially completely changing the character of the "primary" reference teaching being "modified".

Furthermore, the Examiner's unsupported allegations concerning what would be "inherent" in such a modified system fails to demonstrate that the very strict requirements associated with the "doctrine of inherency" could possibly be met.

With respect to applicant's claim 66, it is required that each frame (of a regular frame structure which has the same frame period in both segments of a multi-segment network) conveys control bits forming part of a control message frame transmitted over plural frames and over all segments of the ring, successive control message frames forming a control channel which is shared by all stations of the ring network, the control channel having a constant data rate for control information in all segments. Claim 66

also requires the data rate in a first segment of the ring to be higher than that in a second segment of the ring while remaining synchronized with a master clock.

The Examiner relies upon the high-rate optical data payload 24 of Gitlin '689 that may have different effective data rates from one packet to the next (e.g., see the Examiner's reference to the language in claim 1 at column 6, lines 30-35). However, there is nothing in Gitlin '689 that teaches there to be any particular frame structure, synchronization, control information or other attribute associated with the optical data payload 24 that is transparently routed through the Gitlin '689 switch without any detection or data processing whatsoever. Even if "modified" by some or all the Ramfelt '315 teaching, there is still nothing to indicate that the quite possibly different data rate optical packet payloads 24 of Gitlin '689 in successive packets have anything in common with one another – let alone any constant rate control data or the like embedded therewithin. Indeed, the gist of the Gitlin '689 teaching is that different data rates would be associated with respectively different communication rings – albeit plural such rings are overlaid with respect to each other.

Independent claim 78 also requires each frame of a regular frame structure in two different data rate/quantity segments of the network to include control bits forming part of a control message frame transmitted over plural frames and over all segments of the ring, successive control message frames forming a control channel shared by all stations of the ring and having a constant data rate for control information in all segments.

Independent claim 83 requires a mixed speed mode within the context of a regular frame structure and wherein each frame conveys control bits forming part of a control message frame transmitted over plural frames and over all segments of the ring, successive control message frames forming a control channel shared by all stations of the ring network and having a constant data rate for control information in all segments.

Claims dependent from these independent claims add yet further material and patentably distinguished features to the applicant's claimed invention.

Previously presented independent claim 90 explicitly requires the transmission of successive frames in equal time periods with the same number of control bits being transmitted in each frame to form a control channel shared by all stations of the ring network wherein different numbers of payload data bits are transmitted in respectively corresponding different ones of the frames to form a plurality of ring link segments having different payload data rates to respectively corresponding different stations of the ring network. This also is quite different from the "almost all" optical network of Gitlin '689 where the data payload actually bypasses the active electronic switch control circuits.

New claims 91-102 can be analogized to the earlier presented claims 67, 70, 71, 75-78, 82, 83 and 87-90 respectively. However, these new claims have been amended in

an effort to avoid any possible argument vis-à-vis prior art such as Gitlin '689 and/or Ramfelt '315.

These new claims substantially avoid the terms "control channel" and "control messages" which can be viewed as merely a particular form of "payload" for the applicant's network. Please see the description of Figure 10 at pages 23-25 of the specification, particularly at the paragraphs "source data bytes" and "control bits". The distinction between these two types of payload is explained for example at page 17, lines 11-14 of the specification. The phrase "control messages" is appropriate in the context of the audio/video distribution network, but if the words "control" cause any possible allegation of relevant prior art, the word control is substantially eliminated in the new claims.

It should be noted that the different frame structures in the segments of the applicant's ring provide <u>capacity</u> for payload data, and it is then up to the design of a particular application, whether that capacity is used for payload data bits at a given time. Even in a prior art network, there may be situations where it can be said that the rate of payload data bits carried in one segment of the ring is far greater than in another.

As previously noted, Gitlin does <u>not</u> teach a ring network even similar to the claimed class of networks. For present purposes, however, it may be sufficient to point

out several key differences between what is disclosed by Gitlin and the requirements of the new independent claims.

The Examiner states that Gitlin et al. disclose "only the rate of the data portion is changed...while the rate of the control portion is the same". The Examiner in this regard presumably equates the "header" and "trailer" of Gitlin with the messaging channel of the present invention. However, as earlier noted, Gitlin describes a packet-switched network where the header and trailer contain information relating to the source and destination of the payload data (24) within the packet, i.e., which cause the packet ot be transparently switched and routed to different nodes of the network (see column 3, lines 3-24) and Figures 1-2).

Packet switched networks are well known to be less suitable for the delivery of high bandwidth isochronous data, such as is required for audio and video entertainment. Therefore, the skilled person would be unlikely to see any valuable teaching in Gitlin et al., when looking to expand versatility of the admitted prior art network. The fact that video and voice channels are indicated in Figure 10 of Gitlin implies only video telephone communications, in which "dropouts" and repeated frames of data are generally acceptable. As described in column 5, lines 7-51 of Gitlin et al., the network provides some buffering for packets which cannot be delivered on time, because unnecessary links are in use by another packet. This would not be acceptable for hi-fi

audio and video information (even though the claimed invention does not exclude the carrying of packetized data as payload).

The information in the header and trailer of Gitlin is related to the routing of data of one packet through the network, and does not constitute a "messaging channel which is shared by all stations of the ring network and has a constant data rate in all segments". The header and trailer (and only the header and trailer) are interpreted by switching control circuits at each switching node only. As shown in Figure 2 of Gitlin, the header is processed electronically to identify the necessary routing, before the entire packet is switched by the photonic (optical) switch 40, to a different segment of the network. Therefore, the header information will only be seen on one of the three outgoing segments 42, 44, 46 and it is impossible to use the header and trailer fields of Gitlin to form a messaging channel shared by all stations of the network. Consequently, Gitlin also fails to suggest any bits of a regular frame structure that could be used to convey a message over plural frames of the network. Indeed, Gitlin only describes discrete packets, and not regular shared frames at al.

Since switching of packets is done (transparently) in the optical domain, it is not possible for the amount of data in the outgoing packet to be any different from that in the incoming packets. Frames in the present system are newly generated at each node, although indirectly synchronized to the master clock, this gives the freedom to change the amount of data in each segment, as claimed.

Ramfelt et al. discloses a system in which data is transmitted around a ring in time slots, including data slots and "control slots" see (columns 5-6 in the discussion of Figure 3, for example). However, as discussed at the top of column 14, "control slots" in Ramfelt are apparently individual to the nodes, and do not form any shared channel. In column 9, Ramfelt briefly discusses connecting two of his networks even though they operate at different speeds, and maintaining synchronization between them, provided the cycle time and slot length are constant. However, this provides no disclosure or suggestion that one could convey messages between them in a shared messaging channel, nor does it in fact disclose different data speeds at different segments of the same ring.

As previously noted, claim 90 (and new related claim 102) also contains requirements which distinguish the invention over the prior art, e.g., that messages are conveyed by bits in successive frames, and form a messaging channel shared by all stations of the ring network.

Turning to the advantages provided by the present invention, it is explained in the specification at page 24, lines 25-27, that control messages can pass seamlessly between single speed and double speed segments of the same ring network. As illustrated in applicant's Figure 12, for example, a DVD-playing facility can be added to an in-car network, requiring much higher data rates than in a prior network playing only CD audio. Most advantageously the components already developed and manufactured for playing of CDs do not require modification to carry any part of the high speed data, in order for the

DVD reader and display to be incorporated as one segment of the ring network. No part of the nodes (1) and (2) shown in Figure 12 has to operate at the higher data rate, and therefore parts already specified and passed as compatible with a motor manufacturer's requirements can be used without modification.

In contrast, in Gitlin's scheme, every station in the network requires a high speed coupler, delay and photonic switch parts, in order to process the high rate data. The only saving is that the decoding of header information and trailer information and control of the photonic switch can be performed by components designed for lower speed operation. While this brings some advantage, it fails to give advantages of the invention as specified above.

The Gitlin teaching may be useful in reducing the costs of switching nodes in a network, but cannot reduce the cost of any node which has to insert or access the payload data (see column 3, lines 16-24). The networks of Gitlin are to operate in the optical domain at gigabit rates, and Gitlin seeks to bring this within the realm of existing technology (column 2, lines 61-63). The present invention is aimed at consumer electronic networks whose price must be orders of magnitude lower than those of Gitlin. Moreover, it can be seen in Gitlin's Figure 1 that, as one increases the data rate in the data section 24, one still cannot reduce the overhead required by the header and trailer sections 22, 26. Therefore the use of the low rate header and trailer in Gitlin brings compatibility with cheaper circuits (not nodes), but at the expense of network efficiency.

In Gitlin's scheme, this header and trailer information is always transmitted at the low data rate which limits the gains which can be obtained by moving to a higher data rate. By contrast, in the present invention, there is no requirement for the bit rate of the messaging data to be reduced, and the CF bits (control message) in the exemplary frame structure of Figure 8 are transmitted, in the high speed segment, at the high speed data rate. Ramfelt fails to remedy these deficiencies.

In summary, where the admitted prior art requires stations to generate frames for passing on to subsequent stations, and to repeat data to the next station around the ring synchronously with a master station, that prior art offers no suggestion or mechanism by which different parts of that network can operate at different speeds, while maintaining synchronization and a shared message channel around the ring. Gitlin fails completely to offer any solution to this problem as its teaching appears limited to a packet switched network. A shared messaging channel cannot be established through the header and trailer information. Moreover, Gitlin fails to achieve what is achieved by the present invention in two respects. Firstly, all stations are required to handle the high rate data payloads 24. Therefore the benefit of being able to use existing low-rate products in a network which also includes high rate products is not offered. Secondly, the presence of the low-speed receiver 34 in any station of Gitlin's network requires that all stations generate header and trailer fields with low rate data. constituting a significant limitation

on the bandwidth efficiency which can be achieved by moving to the higher data rate in the first place.

Accordingly, this entire application is now believed to be in allowable condition and a formal Notice to that effect is respectfully solicited.

Respectfully submitted,

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